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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/736,864	12/14/2000	Takahiro Iijima	CU-2417 RJS	8303

7590 11/26/2002
Ladas & Parry
224 South Michigan Avenue
Chicago, IL 60604

EXAMINER

CHU, CHRIS C

ART UNIT	PAPER NUMBER
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2815

DATE MAILED: 11/26/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/736,864

Applicant(s)

IIJIMA ET AL.

Examiner

Chris C. Chu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 September 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 - 14 is/are pending in the application.
- 4a) Of the above claim(s) 2 - 10, 12 and 14 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 11 and 13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 04 September 2002 is: a) ☐ approved b) ☒ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other:

DETAILED ACTION

Response to Amendment

1. Applicant's amendment filed on September 4, 2002 has been received and entered in the case.

Drawings

2. The proposed drawing correction and/or the proposed substitute sheets of drawings, filed on September 4, 2002 have been disapproved because it is not in the form of a pen-and-ink sketch showing changes in red ink or with the changes otherwise highlighted. See MPEP § 608.02(v). A proper drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The correction to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1, 11 and 13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 1, 11 and 13, the term "substantially" is a relative term which renders the claim indefinite. The term "substantially" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1, 11 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grube et al. in view of Mones et al.

Regarding claim 1, Grube et al. discloses in Fig. 6A, column 9, lines 1 ~ 3 and column 12, lines 51 ~ 56 a multilayer interconnection substrate comprising:

- an uppermost interconnection layer (610) having a plurality of terminal pads (the structure under 620a) formed at positions corresponding to a plurality of external

connection terminals provided on a semiconductor element which is to be mounted on said multilayer interconnection substrate;

- a metal column (620) formed on each of said terminal pads;
- a resin film (622) covering a side surface of said metal column; and
- an insulating layer (612) formed on said uppermost interconnection layer so that a gap (614) is formed between the insulating layer and an outer peripheral surface of said resin film.

Grube et al. does not disclose an upper end surface of each metal column is substantially at the same height as an upper surface of the insulating layer. However, Mones et al. discloses in Fig. 2 an upper end surface of each metal column (16) being substantially at the same height as an upper surface of an insulating layer (24). Thus, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to modify Grube et al. by using an upper end surface of each metal column being substantially at the same height as an upper surface of the insulating layer as taught by Mones et al. The ordinary artisan would have been motivated to modify Grube et al. in the manner described above for at least the purpose of increasing a physical protection afforded to substrate (column 5, lines 63 ~ 67).

Regarding claim 11, Grube et al. discloses in Fig. 6A, column 9, lines 1 ~ 3 and column 12, lines 51 ~ 56 a semiconductor device comprising:

- a multilayer interconnection substrate which comprises
- an uppermost interconnection layer (610) having

- a plurality of terminal pads (the structure under 620a) formed at positions corresponding to a plurality of external connection terminals provided on a semiconductor element which is to be mounted on said multilayer interconnection substrate;
- a metal column (620) formed on each of said terminal pads;
- a resin film (622) covering a side surface of the metal column; and
- an insulating layer (612) formed on said uppermost interconnection layer so that a gap (614) is formed between the insulating layer and an outer peripheral surface of said resin film.

Grube et al. does not disclose an upper end surface of each metal column is substantially at the same height as an upper surface of the insulating layer. However, Mones et al. discloses in Fig. 2 an upper end surface of each metal column (16) being substantially at the same height as an upper surface of an insulating layer (24). Thus, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to modify Grube et al. by using an upper end surface of each metal column being substantially at the same height as an upper surface of the insulating layer as taught by Mones et al. The ordinary artisan would have been motivated to modify Grube et al. in the manner described above for at least the purpose of increasing a physical protection afforded to substrate (column 5, lines 63 ~ 67).

Regarding claim 13, Grube et al. discloses in Fig. 6A, column 9, lines 1 ~ 3 and column 12, lines 51 ~ 56 a semiconductor device comprising:

- multilayer interconnection substrate manufactured by

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- forming a plurality of terminal pads (the structure under 620a) in an uppermost interconnection layer (610);
- forming an insulating layer (612) on said uppermost interconnection layer;
- forming openings (606) in said insulating layer, the openings located at positions corresponding to said terminal pads;
- filling each of said openings with metal particles;
- forming a metal column (620) in each of said openings by heating said metal particles at a temperature which melts said metal particles; and
- removing a part of said insulating layer near but not adjacent to a peripheral side of said metal column, while leaving a part of said insulating layer (622) adjacent to said peripheral side of said metal column, so that a gap (614) is formed around but not adjacent to said peripheral side of said metal column.

Grube et al. does not disclose an upper end surface of each metal column is substantially at the same height as an upper surface of the insulating layer. However, Mones et al. discloses in Fig. 2 an upper end surface of each metal column (16) being substantially at the same height as an upper surface of an insulating layer (24). Thus, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to modify Grube et al. by using the upper end surface of each metal column being substantially at the same height as an upper surface of the insulating layer as taught by Mones et al. The ordinary artisan would have been motivated to modify Grube et al. in the manner described above for at least the purpose of increasing a physical protection afforded to substrate (column 5, lines 63 ~ 67).

Further, the claim 13 is product-by-process claim, even though product-by-process claim is limited by and defined by the process, determination of patentability is based upon the product itself. The patentability of a product does not depend on its method of production. If the product in product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product is made by a different process. In re Thorpe, 227 USPQ 964, 966 (Fed. Cir. 1985) (citations omitted). A “product by process” claim is directed to the product per se, no matter how actually made, In re Hirao, **190 USPQ 15 at 17** (footnote 3). See also In re Brown, **173 USPQ 685**; In re Luck, **177 USPQ 523**; In re Fessmann, **180 USPQ 324**; In re Avery, **186 USPQ 116**; In re Wertheim, **191 USPQ 90** (**209 USPQ 254** does not deal with this issue); and In re Marosi et al., **218 USPQ 289** final product per se which must be determined in a “product by, all of” claim, and not the patentability of the process, and that an old or obvious product, whether claimed in “product by process” claims or not. Note that Applicant has the burden of proof in such cases, as the above caselaw makes clear.

Response to Arguments

7. Applicant's arguments with respect to claims 1, 11 and 13 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chris C. Chu whose telephone number is (703) 305-6194. The examiner can normally be reached on M-F (10:30 - 7:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C. Lee can be reached on (703) 308-1690. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7382 for regular communications and (703) 308-7722 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Chris C. Chu
Examiner
Art Unit 2815

c.c.
November 24, 2002



EDDIE LEE
SUPERVISOR, PATENT EXAMINER
TECHNOLOGY CENTER